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Attorney Docket No. P20380

Mail Stop Amendment

In re application of : Satyandra K. GUPTA et al.

Application No : 09/818,505 Group Art Unit: 2128

Filed : March 28, 2001 Examiner : H.M. Jones

For : APPARATUS AND METHOD FOR MULTI-PART SETUP PLANNING FOR SHEET METAL BENDING OPERATIONS

Mail Stop Amendment
Commissioner for Patents
U.S. Patent and Trademark Office
Customer Service Window, Mail Stop **Amendment**
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

Transmitted herewith is an **Appeal Brief Under §41.37** in the above-captioned application.
___ Small Entity Status of this application under 37 C.F.R. 1.9 and 1.27 has been established by a previously filed statement.
___ A verified statement to establish small entity status under 37 C.F.R. 1.9 and 1.27 is enclosed.
___ An Information Disclosure Statement, PTO Form 1449, and references cited.
___ No additional fee is required.

The fee has been calculated as shown below:

Claims After Amendment	No. Claims Previously Paid For	Present Extra	Small Entity		Other Than A Small Entity	
			Rate	Fee	Rate	Fee
Total Claims: 33	*33	0	X25=	$	x 50=	$0.00
Indep. Claims: 4	**4	0	X100=	$	X200=	$0.00
Multiple Dependent Claims Presented			+180=	$	+360=	$0.00
Appeal Brief				$		$500.00
			Total:	$	Total:	$500.00

___ Please charge my Deposit Account No. 19-0089 in the amount of $_____.
X A Check in the amount of $ 500.00 to cover the filing/extension fee(s) is included.
X The U.S. Patent and Trademark Office is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 19-0089.
X Any additional filing fees required under 37 C.F.R. 1.16.
X Any patent application processing fees under 37 C.F.R. 1.17, including any required extension of time fees in any concurrent or future reply requiring a petition for extension of time for its timely submission (37 CFR 1.136)(a)(3).

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P20380.A11

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants : Satyandra K. GUPTA et al.

Group Art Unit: 2128

Appln. No. : 09/818,505

Examiner: H.M. Jones

Filed : March 28, 2001

For : APPARATUS AND METHOD FOR MULTI-PART SETUP PLANNING FOR SHEET METAL BENDING OPERATIONS

APPEAL BRIEF UNDER §41.37

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Service Window, Mail Stop Amendment
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

This appeal is from the Examiner's rejection of claims 1-20, 23-27 and 30-33, as set forth in the Final Official Action of November 30, 2004.

A Notice of Appeal was filed on February 28, 2005 in response to the Final Official Action of November 30, 2004, and the two-month period for response was set to expire on April 28, 2005. The requisite fee for filing an Appeal Brief under 37 C.F.R. § 1.17(c) is submitted herewith.

However, if for any reason the necessary fee is not associated with this file or the attached fee is inadequate, the Commissioner is authorized to charge the fee for the Appeal Brief and any necessary extension of time fees to Deposit Account No. 19-0089.

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(1) REAL PARTY IN INTEREST

The real parties in interest are Amada Company, Ltd. and Amada America, Inc., as established by an assignment recorded for the parent U.S. Patent Application No. 08/927,291 (now U.S. Patent No. 6,233,538) in the U.S. Patent and Trademark Office on September 11, 1997, at Reel 008799 and Frame 0584.

(2) RELATED APPEALS AND INTERFERENCES

No related appeals and/or interferences are pending.

(3) STATUS OF THE CLAIMS

Claims 1-20, 23-27 and 30-33 stand finally rejected. Claims 21-22 and 28-29 stand objected-to. A copy of claims 1-33 is attached as an Appendix to this brief.

(4) STATUS OF THE AMENDMENTS

No amendments to the claims were filed under 37 C.F.R. § 1.116 after the Examiner's final rejection of the claims on November 30, 2004.

(5) SUMMARY OF THE CLAIMED SUBJECT MATTER

Initially, Appellants note that the following descriptions are made with respect to the independent claims and include references to particular parts of the specification. As such, the following are merely exemplary and are not a surrender of other aspects of the present invention that are also enabled by the present specification and that are directed to equivalent structures or methods.

The present invention relates to setup planning for operations to be performed by a workstation in accordance with a shared setup plan. The setup planning according to the present invention enables simultaneous planning for multiple parts and identification of shared or composite setup plans for performing operations on different parts (Specification, page 6, lines 21-24). The setup planning of the present invention provides greater efficiency and through-put in the manufacture of parts at a manufacturing facility (Specification, page 6, lines 19-21).

Independent claim 1 requires a method for multi-part setup planning for operations to be performed by a bending workstation on a plurality of sheet metal parts in accordance with a composite setup plan, said method comprising: identifying setup constraints for operations to be performed on each of said plurality of parts; determining, in accordance with the setup constraints that are identified, operations to be performed on said parts that have compatible setup constraints; and assigning operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts; wherein each of the setup constraints comprises a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of the parts in the workstation to perform said operations.

In this regard, an exemplary embodiment of the present invention is shown in the specification. The exemplary embodiment discloses a method for multi-part setup planning for operations to be performed by a bending workstation on a plurality of sheet metal parts in accordance with a composite setup plan, said method comprising: identifying setup constraints for operations to be performed on each of said plurality of parts (S.8); determining, in accordance with the setup constraints that are identified, operations to be

performed on said parts that have compatible setup constraints (S.16); and assigning operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts (S.20); wherein each of the setup constraints comprises a set of setup constraint parameters (Gr, Gl, Or, Ol, Sr, Sl), said setup constraint parameters defining setup constraints relating to the positioning of the parts in the workstation to perform said operations.

Independent claim 8 requires a multi-part setup planning system for generating a composite setup plan for operations to be performed by a bending workstation on a plurality of sheet metal parts, said system comprising: a constraint identifier that identifies setup constraints for operations to be performed on each of said plurality of parts; a judgement apparatus that determines, in accordance with the setup constraints that are identified by said identifier, operations to be performed on said parts that have compatible setup constraints; and an operations assignor that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to thereby develop a composite setup plan for said plurality of parts; wherein each of the setup constraints comprise a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of the parts in the workstation to perform said operations.

In this regard, an exemplary embodiment of the present invention is shown in the specification. The exemplary embodiment discloses a multi-part setup planning system (Fig. 9A) for generating a composite setup plan for operations to be performed by a bending workstation on a plurality of sheet metal parts (page 56, line 18 to page 57, line 7), said system comprising: a constraint identifier that identifies setup constraints for

operations to be performed on each of said plurality of parts (page 46, lines 4-9); a judgement apparatus that determines, in accordance with the setup constraints that are identified by said identifier, operations to be performed on said parts that have compatible setup constraints (page 47, lines 7-12); and an operations assignor that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to thereby develop a composite setup plan for said plurality of parts (page 47, lines 12-23); wherein each of the setup constraints comprise a set of setup constraint parameters (Gr, Gl, Or, Ol, Sr, Sl), said setup constraint parameters defining setup constraints relating to the positioning of the parts in the workstation to perform said operations.

Independent claim 16 requires a method for setup planning for operations to be performed by a workstation in accordance with a shared setup plan, said method comprising: defining a family of parts; identifying setup constraints imposed by operations to be performed on each part of said family of parts; and generating a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts; wherein each of the setup constraints comprises a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of each part in the workstation to perform said operations.

In this regard, an exemplary embodiment of the present invention is shown in the specification. The exemplary embodiment discloses a method for setup planning for operations to be performed by a workstation in accordance with a shared setup plan, said method comprising: defining a family of parts (page 57, line 23 to page 58, line 2); identifying setup constraints imposed by operations to be performed on each part of said family of parts (S. 8); and generating a shared setup plan that satisfies all of the

setup constraints that are identified for said family of parts (Table 3, pages 59-60); wherein each of the setup constraints comprises a set of setup constraint parameters (Gr, Gl, Or, Ol, Sr, Sl), said setup constraint parameters defining setup constraints relating to the positioning of each part in the workstation to perform said operations.

Independent claim 25 requires a setup planning system for generating a shared setup plan for operations to be performed by a workstation, said system comprising: a definition apparatus that defines a family of parts; an identification apparatus that identifies setup constraints imposed by operations to be performed on each part of said family of parts; and a generator that generates a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts; wherein each of the setup constraints comprises a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of each part in the workstation to perform said operations.

In this regard, an exemplary embodiment of the present invention is shown in the specification. The exemplary embodiment discloses a setup planning system (Figure 9A) for generating a shared setup plan for operations to be performed by a workstation, said system comprising: a definition apparatus that defines a family of parts (page 57, line 23 to page 58, line 2); an identification apparatus that identifies setup constraints imposed by operations to be performed on each part of said family of parts (page 46, lines 4-22); and a generator that generates a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts (Table 3, pages 59-60); wherein each of the setup constraints comprises a set of setup constraint parameters (Gr, Gl, Or, Ol, Sr, Sl), said setup constraint parameters defining setup constraints relating to the positioning of each part in the workstation to perform said operations.

(6) **GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

(A) Whether Claims 1-20, 23-27 and 30-33 are properly rejected under 35 U.S.C. § 103(a) over LeCLAIR (U.S. Patent No. 5,485,390) in view of WAKAHARA et al. (U.S. Patent No. 5,029,462).

(7) **ARGUMENT**

The Rejection of Claims 1-20, 23-27 and 30-33 Under 35 U.S.C. § 103(a) over LeCLAIR (U.S. Patent No. 5,485,390) in view of WAKAHARA et al. (U.S. Patent No. 5,029,462) and the taking of Official Notice is Improper, and the Decision to Reject Claims 1-20, 23-27 and 30-33 on this Ground Should be Reversed.

In the Final Official Action of November 30, 2004, 2004, the Examiner rejected claims 1-20, 23-27 and 30-33 Under 35 U.S.C. § 103(a) over LeCLAIR (U.S. Patent No. 5,485,390) in view of WAKAHARA et al. (U.S. Patent No. 5,029,462). Appellants respectfully submit that the rejection of each of claims 1-20, 23-27 and 30-33 Under 35 U.S.C. § 103(a) over LeCLAIR in view of WAKAHARA is improper and should be reversed. In this regard, Appellants hereinbelow address the rejection of independent claims 1, 8, 16 and 25 and dependent claims 2-7, 9-15, 17-20, 23-24, 26-27 and 30-33 under 35 U.S.C. § 103(a) over LeCLAIR in view of WAKAHARA in the numerical order of the claims.

Initially, Appellants note that the outstanding Final Official Action appears to only apply WAKAHARA for the disclosure of "*a method of bending a workpiece including setting a bending process and preparing bending data*" (see page 4, paragraph 8 of the Final Official Action). Accordingly, the outstanding Final Official Action appears to apply LeCLAIR or "Official Notice" to each of the remaining features of the invention recited in the rejected claims. For the purpose of presenting a concise Appeal Brief and expediting

resolution of this Appeal, with respect to WAKAHARA, Appellants acknowledge solely that WAKAHARA discloses, a *method of bending a workpiece... including... setting... a bending process sequence for bending the workpiece...,comprising... preparing data... including numbers assigned to a series of bending points... a bending length and a bending angle for each of the bending points* (see claim 1 of WAKAHARA). However, Appellants respectfully submit that WAKAHARA, whether considered alone or in combination with LeCLAIR, does not disclose, suggest or render obvious the combination of features recited in claim 1 of the present application, and has not been applied in the Final Official Action as disclosing, suggesting or rendering obvious anything other than that which is noted above with respect to page 4, paragraph 8 of the Final Official Action.

Appellants further submit that the rejection of the claims of the present application as obvious over LeCLAIR in view of WAKAHARA is wholly in error, as is explained below.

(A) Claim 1

Appellants respectfully submit that the rejection of claim 1 over LeCLAIR in view of WAKAHARA and the taking of Official Notice is improper.

Initially, Appellants will address the following assertions in the outstanding Final Official Action, at paragraph 10, page 4:

> "*In any case, official notice is taken it would have been obvious to one of ordinary skill in the art at the time of the invention that the bending of sheet metal is a standard and well known machining process – and thus that the disclosure of LeClair et al. would be relevant as applied to sheet metal bending. Furthermore, Leclair et al. do not explicitly disclose discloses a single part which is to be processed. Claims 1-2 and 10-11 disclose multi-part setup – however, official notice*

is taken that it would have been obvious to one of ordinary skill in the art at the time of the invention to generalize setup planning for one piece of sheet metal to more than one piece of sheet metal. ***In any event, LeClair et al. disclose families of parts – see discussion below.***" (emphasis in original).

Appellants submit that the above-noted assertions demonstrate the failings of the rejections in the outstanding Final Official Action. In this regard, the Examiner has asserted that it would be obvious to modify the primary reference with teachings that the Examiner has been unable and/or unwilling to cite. Additionally, the above-noted assertions mischaracterize the invention so as to effectively ignore numerous of the features recited in the claims.

In this regard, the Manual of Patent Examining and Procedure at section 2144.03 states "Official Notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known". Additionally, the Manual of Patent Examining and Procedure at section 2144.03 includes an entire section titled "C. If Applicant Challenges a Factual Assertion as Not Properly Officially Noticed or not Properly Based Upon Common Knowledge, the Examiner Must Support the Finding With Adequate Evidence".

Despite the clear mandates of the above-noted section of the Manual of Patent Examining Procedure, and despite applying four or more references in rejecting the claims of the present application, the Examiner has been unable or unwilling to cite a single reference that discloses, suggests or renders obvious the invention recited in the present claims. Appellants note that the Response Under 37 C.F.R. §1.111 specifically requested

that the Examiner provide a reference that teaches the features of the present application which the Examiner admits are not disclosed or suggested by either of LeCLAIR or WAKAHARA. However, rather than provide a reference that discloses the features recited in claim 1 for which he has relied upon Official Notice, the outstanding Final Official Action asserts that Appellants have improperly challenged the taking of Official Notice by asserting that these features "are not present in the prior art" and requesting that the Examiner provide evidence to support his taking of Official Notice.

Furthermore, the above-noted assertions mischaracterize the features recited in claim 1, first as a mere generalization of "setup planning... to more than one piece of sheet metal", and second as merely relating to "families of parts". However, Appellants note that the features recited in claim 1 cannot be generalized in the manner asserted in the outstanding Final Official Action.

In other words, for the rejection of claim 1 to be proper, the outstanding Official Action would have to show that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain "multi-part setup planning for operations to be performed... in accordance with a composite setup plan... comprising... determining operations to be performed on said parts that have compatible setup constraints... and assigning operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts". However, the rejection of claim 1 is improper, and does not show that the disclosure of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain at least the above-noted combination of features

recited in claim 1.

For example, LeCLAIR does not disclose multi-part setup planning, and thus cannot disclose a composite setup plan or the above-noted features that relate to a composite setup plan. Additionally, LeCLAIR does not disclose, suggest or render obvious numerous of the additional features recited in claim 1. Furthermore, even if one were to extrapolate setup planning for a single part into individual setup planning for each of several parts, such an extrapolation would not result in the combination of features recited in claim 1. In particular, LeCLAIR does not disclose, suggest or render obvious "determining operations to be performed on said parts that have compatible setup constraints". Furthermore, LeCLAIR does not disclose, suggest or render obvious "assigning operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts".

Appellants further submit that the individual assertions at pages 5-6 of the Final Official Action are rife with errors. In this regard, the Final Official Action asserts that LeCLAIR discloses a "family of parts" in the Abstract, Figures 2, 6, 12, 16, 21; col. 2, lines 3-12 and 41-54; col. 3, lines 1-17; col. 5, lines 37-50; col. 6, line 55 to col. 7, line 41, but admits that these portions of LeCLAIR are a "discussion of use of experience obtained via previous work on similar designs". However, Appellants note that they are not claiming "use of experience obtained via previous work on similar designs".

As noted above, the features of claim 1 that are not disclosed, suggested or rendered obvious by LeCLAIR in combination with any other reference applied by the Examiner, include "multi-part setup planning for operations to be performed... in accordance with a composite setup plan... comprising... determining operations to be performed on said parts that have compatible setup constraints... and assigning operations

that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts". In this regard, none of the disclosure of LeCLAIR is directed to a "composite setup plan" for "parts that have compatible setup constraints", or to "assigning operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts", as is recited in claim 1.

Additionally, the outstanding Final Official Action does not apply WAKAHARA or any other reference as disclosing, suggesting or rendering obvious the above-noted features recited in claim 1 but lacking in LeCLAIR. In this regard, rather than providing another reference that discloses, suggests or renders obvious the above-noted features recited in claim 1, the Final Official Action takes pains to explain why such a reference, which would necessarily have to show that the above-noted features are notoriously well-known in the art, need not be provided.

Accordingly, Appellants respectfully submit that LeCLAIR (as well as the combination of LeCLAIR, WAKAHARA and any other reference) does not disclose, suggest or render obvious the above-noted features of claim 1. Appellants further submit that the Examiner has not asserted that any other reference discloses, suggests or renders obvious such features, and has certainly not cited any such reference. Appellants further submit that there has been no assertion, let alone a showing, of any motivation in the prior art to modify LeCLAIR to obtain at least the above-noted features recited in claim 1.

(B) Claims 2-7

Appellants additionally submit that claims 2-7 are allowable, at least for the reason that these claims depend from claim 1, respectively, and because these claims recite

additional features that further define the present invention. Appellants further submit that claims 2-7 are separately patentable over LeCLAIR in view of WAKAHARA, which fails to disclose or render obvious, in the claimed combination, inter alia,

(i) wherein said determining includes identifying a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations (claim 2);

(ii) wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount (claim 3);

(iii) wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

Gr + Gl + L - clearance,

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount (claim 4);

(iv) wherein said setup constraints are identified in accordance with the following:

(Gr + Gl + L - clearance) S (L - tolerance),

Gl - .5(clearance) P,

Gr - .5(clearance) (S - P - L),

Sr (S - P - L + Dr), and

Sl (P + Dl),

where "Dl" is a distance between a present tooling stage and a left adjacent tooling stage, "Dr" is a distance between the present tooling stage and a right adjacent tooling stage, "L" is the length of a bend line at the bend position of the part, "S" is a length of the present tooling stage, and "P" is a relative position of the bend line with respect to a left edge of the present tooling stage (claim 5);

(v) wherein said identifying includes determining each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the bending workstation for each operation (claim 6); and

(vi) wherein said determining includes providing a geometric model of the intermediate shape of the part and the configuration of the tooling, and calculating part-tool intersection regions to determine setup constraint parameters for each operation (claim 7).

(C) Claim 8

Appellants submit that the rejection of claim 8 is improper for reasons similar to those noted above with respect to the rejection of claim 1. In other words, for the rejection of claim 8 to be proper, the outstanding Official Action would have to show that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain a "multi-part setup planning system for generating a composite setup plan for operations to be performed... comprising... a judgement apparatus that determines... operations to be performed on said parts that have compatible setup constraints... and an operations assignor that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to

thereby develop a composite setup plan for said plurality of parts". However, the rejection of claim 8 is improper, and does not show that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain at least the above-noted combination of features recited in claim 8.

For example, LeCLAIR does not disclose multi-part setup planning, and thus cannot disclose a composite setup plan or the above-noted features that relate to a composite setup plan. Additionally, LeCLAIR does not disclose, suggest or render obvious numerous of the additional features recited in claim 8. Furthermore, even if one were to extrapolate setup planning for a single part to individual setup planning for each of several parts, such an extrapolation would not result in the combination of features recited in claim 8. In particular, LeCLAIR does not disclose, suggest or render obvious "a judgement apparatus that determines... operations to be performed on said parts that have compatible setup constraints". Furthermore, LeCLAIR does not disclose, suggest or render obvious "an operations assignor that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to thereby develop a composite setup plan for said plurality of parts".

Additionally, the outstanding Final Official Action does not apply WAKAHARA or any other reference as disclosing, suggesting or rendering obvious the above-noted features recited in claim 8 but lacking in LeCLAIR. In this regard, rather than providing another reference that discloses, suggests or renders obvious the above-noted features recited in claim 8, the Final Official Action takes pains to explain why such a reference, which would necessarily have to show that the above-noted features are notoriously well-known in the art, need not be provided.

Accordingly, Appellants respectfully submit that LeCLAIR (as well as the combination of LeCLAIR, WAKAHARA and any other reference) does not disclose, suggest or render obvious the above-noted features of claim 8. Appellants further submit that the Examiner has not asserted that any other reference discloses, suggests or renders obvious such features, and has certainly not cited any such reference. Appellants further submit that there has been no assertion, let alone a showing, of any motivation in the prior art to modify LeCLAIR to obtain at least the above-noted features recited in claim 8.

(D) Claims 9-15

Appellants additionally submit that claims 9-15 are allowable, at least for the reason that these claims depend from claim 8, respectively, and because these claims recite additional features that further define the present invention. Appellants further submit that claims 9-15 are separately patentable over LeCLAIR in view of WAKAHARA, which fails to disclose or render obvious, in the claimed combination, inter alia,

(i) wherein said judgement apparatus comprises an operations identifier that identifies a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations (claim 9);

(ii) wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount (claim 10);

(iii) wherein said setup constraint parameters for each part include tooling

parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

Gr + Gl + L - clearance,

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount (claim 11);

(iv) wherein said setup constraints are identified by said constraint identifier in accordance with the following:

(Gr+Gl+L-clearance) S (L-tolerance),

Gl-.5(clearance) P,

Gr - .5(clearance) (S-P-L),

Sr (S-P-L+Dr), and

Sl (P+Dl),

where "Dl" is a distance between a present tooling stage and a left adjacent tooling stage, "Dr" is a distance between the present tooling stage and a right tooling stage, "L" is the length of a bend line at the bend position of the part, "S" is a length of the present tooling stage, and "P" is a relative position of the bend line with respect to a left edge of the present tooling stage (claim 12);

(v) wherein said constraint identifier comprises a determination apparatus that determines each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the bending workstation for each operation (claim 13);

(vi) wherein said determination apparatus that determining each of the setup constraints comprises a distributor that provides a geometric model of the intermediate shape of the part and the configuration of the tooling, and a calculator that calculates part-

tool intersection regions to determine setup constraint parameters for each operation (claim 14); and

(vii) a determination apparatus that determines a tooling stage arrangement for said bending workstation, said stage arrangement judgement apparatus comprising an identification apparatus that identifies required tooling stages of the composite setup plan and a generator that generates an arrangement of the required tooling stages in the bending workstation to minimize a transfer frequency of said parts between the tooling stages.

(E) Claim 16

Appellants submit that the rejection of claim 16 is improper for reasons similar to those noted above with respect to the rejection of claim 1. In other words, for the rejection of claim 16 to be proper, the outstanding Official Action would have to show that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain a "method for setup planning for operations to be performed... in accordance with a shared setup plan... comprising... identifying setup constraints imposed by operations to be performed on each part of said family of parts... and generating a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts". However, the rejection of claim 16 is improper, and does not show that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain at least the above-noted combination of features recited in claim 16.

For example, LeCLAIR does not disclose multi-part setup planning, and thus cannot disclose a composite setup plan or the above-noted features that relate to a composite setup plan. Additionally, LeCLAIR does not disclose, suggest or render obvious numerous of the additional features recited in claim 16. Furthermore, even if one were to extrapolate from for a single part to individual setup planning for each of several parts, such an extrapolation would not result in the combination of features recited in claim 16. In particular, LeCLAIR does not disclose, suggest or render obvious "identifying setup constraints imposed by operations to be performed on each part of said family of parts". Furthermore, LeCLAIR does not disclose, suggest or render obvious "generating a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts".

Additionally, the outstanding Final Official Action does not apply WAKAHARA or any other reference as disclosing, suggesting or rendering obvious the above-noted features recited in claim 16 but lacking in LeCLAIR. In this regard, rather than providing another reference that discloses, suggests or renders obvious the above-noted features recited in claim 16, the Final Official Action takes pains to explain why such a reference, which would necessarily have to show that the above-noted features are notoriously well-known in the art, need not be provided.

Accordingly, Appellants respectfully submit that LeCLAIR (as well as the combination of LeCLAIR, WAKAHARA and any other reference) does not disclose, suggest or render obvious the above-noted features of claim16. Appellants further submit that the Examiner has not asserted that any other reference discloses, suggests or renders obvious such features, and has certainly not cited any such reference. Appellants further submit that there has been no assertion, let alone a showing, of any motivation in the prior

art to modify LeCLAIR to obtain at least the above-noted features recited in claim 16.

(F) Claims 17-20

Appellants additionally submit that claims 17-20 are allowable, at least for the reason that these claims depend from claim 16, respectively, and because these claims recite additional features that further define the present invention. Appellants further submit that claims 17-20 are separately patentable over LeCLAIR in view of WAKAHARA, which fails to disclose or render obvious, in the claimed combination, inter alia,

(i) wherein said generating comprises:

determining, in accordance with the setup constraints that are identified, operations to be performed on said parts that have compatible setup constraints; and assigning operations that are determined to have compatible constraints to corresponding tooling stages of the workstation to develop the shared setup plan for said family of parts (claim 17);

(ii) wherein said determining includes identifying a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations (claim 18);

(iii) wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount (claim 19); and

(iv) wherein said setup constraint parameters for each part include tooling

parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

$$Gr + Gl + L - clearance,$$

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount (claim 20).

(G) Claims 23-24

Appellants additionally submit that claims 23-24 are allowable, at least for the reason that these claims depend from claim 16, respectively, and because these claims recite additional features that further define the present invention. Appellants further submit that claims 23-24 are separately patentable over LeCLAIR in view of WAKAHARA, which fails to disclose or render obvious, in the claimed combination, inter alia,

(i) wherein said identifying includes determining each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the workstation for each operation (claim 23); and

(ii) wherein said determining includes providing a geometric model of the intermediate shape of the part and the configuration of the tooling, and calculating part-tool intersection regions to determine setup constraint parameters for each operation (claim 24).

(H) Claim 25

Appellants submit that the rejection of claim 25 is improper for reasons similar to those noted above with respect to the rejection of claim 1. In other words, for the rejection

of claim 25 to be proper, the outstanding Official Action would have to show that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain a "setup planning system for generating a shared setup plan for operations to be performed... comprising... an identification apparatus that identifies setup constraints imposed by operations to be performed on each part of said family of parts... and a generator that generates a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts". However, the rejection of claim 25 is improper, and does not shown that the disclosures of the combination of references, in light of the teachings for which "Official Notice" can be relied upon, would make it obvious for one of ordinary skill in the art to modify LeCLAIR to obtain at least the above-noted combination of features recited in claim 25.

For example, LeCLAIR does not disclose multi-part setup planning, and thus cannot disclose a composite setup plan or the above-noted features that relate to a composite setup plan. Additionally, LeCLAIR does not disclose, suggest or render obvious numerous of the additional features recited in claim 25. Furthermore, even if one were to extrapolate from for a single part to individual setup planning for each of several parts, such an extrapolation would not result in the combination of features recited in claim 25. In particular, LeCLAIR does not disclose, suggest or render obvious "an identification apparatus that identifies setup constraints imposed by operations to be performed on each part of said family of parts". Furthermore, LeCLAIR does not disclose, suggest or render obvious "a generator that generates a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts".

Additionally, the outstanding Final Official Action does not apply WAKAHARA or any

other reference as disclosing, suggesting or rendering obvious the above-noted features recited in claim 25 but lacking in LeCLAIR. In this regard, rather than providing another reference that discloses, suggests or renders obvious the above-noted features recited in claim 25, the Final Official Action takes pains to explain why such a reference, which would necessarily have to show that the above-noted features are notoriously well-known in the art, need not be provided.

Accordingly, Appellants respectfully submit that LeCLAIR (as well as the combination of LeCLAIR, WAKAHARA and any other reference) does not disclose, suggest or render obvious the above-noted features of claim 25. Appellants further submit that the Examiner has not asserted that any other reference discloses, suggests or renders obvious such features, and has certainly not cited any such reference. Appellants further submit that there has been no assertion, let alone a showing, of any motivation in the prior art to modify LeCLAIR to obtain at least the above-noted features recited in claim 25.

(l) Claims 26-27

Appellants additionally submit that claims 26-27 are allowable, at least for the reason that these claims depend from claim 25, respectively, and because these claims recite additional features that further define the present invention. Appellants further submit that claims 26-27 are separately patentable over LeCLAIR in view of WAKAHARA, which fails to disclose or render obvious, in the claimed combination, inter alia,

(i) wherein

said generator comprises:

a judgement apparatus that determines, in accordance with the setup constraints that are identified, operations to be performed on said parts that have

compatible setup constraints; and

a control apparatus that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the workstation to develop the shared setup plan for said family of parts (claim 26); and

(ii) wherein said judgement apparatus includes an identifier that identifies a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations.

(J) Claims 30-33

Appellants additionally submit that claims 30-33 are allowable, at least for the reason that these claims depend from claim 25, respectively, and because these claims recite additional features that further define the present invention. Appellants further submit that claims 30-33 are separately patentable over LeCLAIR in view of WAKAHARA, which fails to disclose or render obvious, in the claimed combination, inter alia,

(i) wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount (claim 30);

(ii) wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

Gr + Gl + L - clearance,

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount (claim 31);

(iii) wherein said identification apparatus includes a judgement apparatus that determines each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the workstation for each operation (claim 32); and

(iv) wherein said judgement apparatus includes a distributor that provides a geometric model of the intermediate shape of the part and the configuration of the tooling, and a calculator that calculates part-tool intersection regions to determine setup constraint parameters for each operation (claim 33).

Accordingly, for each and all the above reasons, Appellants submit that the rejection of claims 1-20, 23-27 and 30-33 under 35 U.S.C. § 103(a) is inappropriate and unsupported by the proposed combination of LeCLAIR and WAKAHARA et al. Therefore, Appellants respectfully request that the decision of the Examiner to reject claims 1-20, 23-27 and 30-33 under 35 U.S.C. § 103(a) be reversed, and that the application be returned to the Examiner for withdrawal of the rejection over LeCLAIR in view of WAKAHARA et al. and an early allowance of claims 1-20, 23-27 and 30-33 on appeal.

(8) CONCLUSION

Appellants respectfully submit that each and every pending claim of the present application meets the requirements for patentability under 35 U.S.C. § 103, and that the present application and each pending claim are allowable over the prior art of record.

Should there be any questions, any representative of the U.S. Patent and

Trademark Office is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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APPENDIX OF CLAIMS

1. A method for multi-part setup planning for operations to be performed by a bending workstation on a plurality of sheet metal parts in accordance with a composite setup plan, said method comprising:

identifying setup constraints for operations to be performed on each of said plurality of parts;

determining, in accordance with the setup constraints that are identified, operations to be performed on said parts that have compatible setup constraints; and

assigning operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to develop a composite setup plan for said plurality of parts;

wherein each of the setup constraints comprises a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of the parts in the workstation to perform said operations.

2. A method for multi-part setup planning according to claim 1, wherein said determining includes identifying a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations.

3. A method for multi-part setup planning according to claim 1, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined

tolerance amount.

4. A method for multi-part setup planning according to claim 1, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

Gr + Gl + L - clearance,

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount.

5. A method for multi-part setup planning according to claim 1, wherein said setup constraints are identified in accordance with the following:

(Gr + Gl + L - clearance) S (L - tolerance),

Gl - .5(clearance) P,

Gr - .5(clearance) (S - P - L),

Sr (S - P - L + Dr), and

Sl (P + Dl),

where "Dl" is a distance between a present tooling stage and a left adjacent tooling stage, "Dr" is a distance between the present tooling stage and a right adjacent tooling stage, "L" is the length of a bend line at the bend position of the part, "S" is a length of the present tooling stage, and "P" is a relative position of the bend line with respect to a left edge of the present tooling stage.

6. A method for multi-part setup planning according to claim 1, wherein said identifying includes determining each of the setup constraints based on an intermediate

shape of the part and a configuration of the tooling of the bending workstation for each operation.

7. A method for multi-part setup planning according to claim 6, wherein said determining includes providing a geometric model of the intermediate shape of the part and the configuration of the tooling, and calculating part-tool intersection regions to determine setup constraint parameters for each operation.

8. A multi-part setup planning system for generating a composite setup plan for operations to be performed by a bending workstation on a plurality of sheet metal parts, said system comprising:

a constraint identifier that identifies setup constraints for operations to be performed on each of said plurality of parts;

a judgement apparatus that determines, in accordance with the setup constraints that are identified by said identifier, operations to be performed on said parts that have compatible setup constraints; and

an operations assignor that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the bending workstation to thereby develop a composite setup plan for said plurality of parts;

wherein each of the setup constraints comprise a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of the parts in the workstation to perform said operations.

9. A multi-part setup planning system according to claim 8, wherein said judgement apparatus comprises an operations identifier that identifies a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations.

10. A multi-part setup planning system according to claim 8, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount.

11. A multi-part setup planning system according to claim 8, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

Gr + Gl + L - clearance,

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount.

12. A multi-part setup planning system according to claim 8, wherein said setup constraints are identified by said constraint identifier in accordance with the following:

(Gr+Gl+L-clearance) S (L-tolerance),

Gl-.5(clearance) P,

Gr - .5(clearance) (S-P-L),

Sr (S-P-L+Dr), and

Sl (P+Dl),

where "Dl" is a distance between a present tooling stage and a left adjacent tooling stage, "Dr" is a distance between the present tooling stage and a right tooling stage, "L" is

the length of a bend line at the bend position of the part, "S" is a length of the present tooling stage, and "P" is a relative position of the bend line with respect to a left edge of the present tooling stage.

13. A multi-part setup planning system according to claim 8, wherein said constraint identifier comprises a determination apparatus that determines each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the bending workstation for each operation.

14. A multi-part setup planning system according to claim 13, wherein said determination apparatus that determining each of the setup constraints comprises a distributor that provides a geometric model of the intermediate shape of the part and the configuration of the tooling, and a calculator that calculates part-tool intersection regions to determine setup constraint parameters for each operation.

15. A multi-part setup planning system according to claim 8, further comprising a determination apparatus that determines a tooling stage arrangement for said bending workstation, said stage arrangement judgement apparatus comprising an identification apparatus that identifies required tooling stages of the composite setup plan and a generator that generates an arrangement of the required tooling stages in the bending workstation to minimize a transfer frequency of said parts between the tooling stages.

16. A method for setup planning for operations to be performed by a workstation in accordance with a shared setup plan, said method comprising:

defining a family of parts;

identifying setup constraints imposed by operations to be performed on each part of said family of parts; and

generating a shared setup plan that satisfies all of the setup constraints that are

identified for said family of parts;

wherein each of the setup constraints comprises a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of each part in the workstation to perform said operations.

17. A method for setup planning according to claim 16, wherein said generating comprises:

determining, in accordance with the setup constraints that are identified, operations to be performed on said parts that have compatible setup constraints; and

assigning operations that are determined to have compatible constraints to corresponding tooling stages of the workstation to develop the shared setup plan for said family of parts.

18. A method for setup planning according to claim 17, wherein said determining includes identifying a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations.

19. A method for setup planning according to claim 16, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount.

20. A method for setup planning according to claim 16, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each

operation that is given by:

$$Gr + Gl + L - clearance,$$

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount.

21. A method for setup planning according to claim 16, wherein said setup constraint parameters for each part comprise:

a gap length “Gr” on a right side of a bend position of the part, which denotes the distance by which a tooling stage can be extended towards the right side of the bend position;

a gap length “Gl” on a left side of the bend position of the part, which denotes the distance by which a tooling stage can be extended towards the left side of the bend;

an obstruction length “Or” on the right side of the bend position; which denotes a space in which not tooling is allowed on the right side of the bend position;

an obstruction length “Ol” on the left side of the bend position; which denotes a space in which no tooling is allowed on the left side of the bend position;

a safety distance “Sr” on the right side of the bend position, which denotes a minimum distance between the bend position and a next tooling stage towards the right side of the bend position; and

a safety distance “Sl” on the left side of the bend position, which denotes a minimum distance between the bend position and a next tooling stage towards the left side of the bend position.

22. A method for setup planning according to claim 21, wherein said setup constraints are identified in accordance with the following:

(Gr + Gl + L - clearance) S (L - tolerance),

Gl - .5(clearance) P,

Gr - .5(clearance) (S - P - L),

Sr (S - P - L + Dr), and

Sl (P + Dl),

where "Dl" is a distance between a present tooling stage and a left adjacent tooling stage, "Dr" is a distance between the present tooling stage and a right adjacent tooling stage, "L" is the length of a bend line at the bend position of the part, "S" is a length of the present tooling stage, and "P" is a relative position of the bend line with respect to a left edge of the present tooling stage.

23. A method for setup planning according to claim 16, wherein said identifying includes determining each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the workstation for each operation.

24. A method for setup planning according to claim 23, wherein said determining includes providing a geometric model of the intermediate shape of the part and the configuration of the tooling, and calculating part-tool intersection regions to determine setup constraint parameters for each operation.

25. A setup planning system for generating a shared setup plan for operations to be performed by a workstation, said system comprising:

a definition apparatus that defines a family of parts;

an identification apparatus that identifies setup constraints imposed by operations to be performed on each part of said family of parts; and

a generator that generates a shared setup plan that satisfies all of the setup constraints that are identified for said family of parts;

wherein each of the setup constraints comprises a set of setup constraint parameters, said setup constraint parameters defining setup constraints relating to the positioning of each part in the workstation to perform said operations.

26. A setup planning system according to claim 25, wherein

said generator comprises:

a judgement apparatus that determines, in accordance with the setup constraints that are identified, operations to be performed on said parts that have compatible setup constraints; and

a control apparatus that assigns operations that are determined to have compatible constraints to corresponding tooling stages of the workstation to develop the shared setup plan for said family of parts.

27. A setup planning system according to claim 26, wherein said judgement apparatus includes an identifier that identifies a set of said operations that have compatible setup constraints by locating tooling stages that can accommodate each operation within said set of operations.

28. A setup planning system according to claim 25, wherein said setup constraint parameters for each part comprise:

a gap length "Gr" on a right side of a bend position of the part, which denotes the distance by which a tooling stage can be extended towards the right side of the bend position;

a gap length "Gl" on a left side of the bend position of the part, which denotes the distance by which a tooling stage can be extended towards the left side of the bend;

a obstruction length "Or" on the right side of the bend position, which denotes a space in which not tooling is allowed on the right side of the end position;

an obstruction length "Ol" on the left side of the bend position; which denotes a space in which not tooling is allowed on the left side of the bend position;

a safety distance "Sr" on the right side of the bend position, which denotes a minimum distance between the bend position and a next tooling stage towards the right side of the bend position; and

a safety distance "Sl" on the left side of the bend position, which denotes a minimum distance between the bend position and a next tooling stage towards the left side of the bend position.

29. A setup planning system according to claim 28, wherein said setup constraints are identified by said identifier in accordance with the following:

(Gr + Gl + L - clearance) S (L - tolerance),

Gl - .5(clearance) P,

Gr - .5(clearance) (S - P - L),

Sr (S - P - L + Dr), and

Sl (P + Dl),

where "Dl" is a distance between a present tooling stage and a left adjacent tooling stage, "Dr" is a distance between the present tooling stage and a right adjacent tooling stage, "L" is the length of a bend line at the bend position of the part, "S" is a length of the present tooling stage, and "P" is a relative position of the bend line with respect to a left edge of the present tooling stage.

30. A setup planning system according to claim 25, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a minimum tooling stage length for each operation that is given by:

L - tolerance,

where "L" is a length of a bend line of the part, and "tolerance" is a predetermined tolerance amount.

31. A setup planning system according to claim 25, wherein said setup constraint parameters for each part include tooling parameters, at least one of said tooling parameters being defined according to a maximum allowed tooling stage length for each operation that is given by:

Gr + Gl + L - clearance,

where "Gr" is a gap length on a right side of a bend position of the part, "Gl" is a gap length on a left side of the bend position of the part, "L" is a length of a bend line at the bend position the part, and "clearance" is a predetermined clearance amount.

32. A setup planning system according to claim 25, wherein said identification apparatus includes a judgement apparatus that determines each of the setup constraints based on an intermediate shape of the part and a configuration of the tooling of the workstation for each operation.

33. A setup planning system according to claim 32, wherein said judgement apparatus includes a distributor that provides a geometric model of the intermediate shape of the part and the configuration of the tooling, and a calculator that calculates part-tool intersection regions to determine setup constraint parameters for each operation.